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A Comparison of Danish and Canadian Consumer Medication Information

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Abstract. Many people around the world use prescription medications. Consumers often require information about their medications to support taking them safely and effectively. One source of such information is Consumer Medication Information (CMI). Canadians typically receive printed CMI when a new prescription is filled whereas Danes have the online resource min.medicin.dk. This study compared the content and design of Danish and Canadian CMI. Danish CMI satisfied seven of the 11 content utility criteria (developed in previous work) identified as supporting the safe and effective medication use. However, Danish CMI provided a more information about how frequently possible side effects occur and multimedia (e.g., images, videos) directions for some medications. This study examined some of the similarities and differences between how Canadians and Danes are informed about medications. However, further research is required to determine what content and methods of delivery are most beneficial in supporting safe and effective medication use.

Keywords. Consumer Medication Information, Patient Education, Patient Leaflets, Content Utility, Information Design, Consumer Health Informatics

Introduction

Many people around the world take prescription medicines, whether it be for a short duration (e.g., antibiotics) or an ongoing basis. Taking a prescription medication has benefits and risks (e.g., side effects, overdoses). Denmark and Canada both have publicly funded healthcare systems. However, these countries have different approaches for informing their citizens about prescription medications.

Consumers having access to medication information is important for the safe and effective use of prescription medications. Canadian consumers have multiple resources for medication information. One of the most common resources is what the authors refer to as Consumer Medication Information (CMI). When a Canadian fills a new prescription (i.e., one never used before, not a refill) a pharmacist will typically verbally discuss important aspects of safe and effective use of the prescription and provide the consumer with CMI printed on paper.

CMI is not reviewed by Health Canada because it is considered "part of the practice of pharmacy, which is the responsibility of provincial authorities" [1]. However, because CMI is not regulated, the information (or the lack thereof) a consumer receives depends on where a new prescription is filled. Monkman and

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Kushniruk [2] found that CMI for the same medication was inconsistent between pharmacies. Further, CMI is not always consistent with regulated medication information referred to as product monographs which offers comprehensive information about prescription medications [1]. To resolve any discrepancies, product monographs are now available online [3]. However, how popular such sites are with Canadians or whether they even are aware this resource is available (as they are not referenced in CMI) remains unknown.

Although Denmark also uses CMI to inform its citizens about the safe and effective use of medications, the method of distributing CMI is quite different than the Canadian protocol. Specifically, Danes are informed by the pharmacist or pharmacist assistant when the drug is picked up at the pharmacy, but are not offered information in print with new prescriptions. Instead, Danes are encouraged to visit the national website min.medicin.dk which offers medication information developed for patients. This site is hyperlinked to two other websites 1) pro.medicin.dk, targeted towards healthcare professionals, and 2) indlaegssedler.dk, offering paper package inserts online, as well as additional information (e.g., videos on how to use the medication). In addition to CMI, min.medicin.dk offers several other tools. Danes can enter different characteristics of a medication (i.e., type, embossing, letters and numbers, shape, colour, and whether it is grooved) to identify medications. The site also provides information about diseases as well as instructional movies and slideshows. As with Canadian CMI, information on min.medicin.dk may differ from the paper package inserts because the website may incorporate information from additional sources.

This study will compare the content utility (i.e., what information is conveyed) and design (i.e., how the information is displayed) of CMI from Canada and Denmark.

1. Methods

Monkman and Kushniruk previously developed and used a framework to evaluate the readability and content utility of CMI from different pharmacies for the same medication [2], as well different medications from the same pharmacy [4]. Drawing from resources for safe and effective medication (primarily the Consumer Information Rating Form [5]), 11 content utility criteria were used in the framework: Benefits, Contraindications, Directions, Missed Dose, Precautions, Adverse Effects, Allergic Reactions, Drug Interactions, Overdose, Storage and General Information [2, 4]. Given that translation may confound measures of readability (i.e., word count, readability score, and reading time), only content utility criteria from this framework were compared between Canadian and Danish CMI. It should be noted that neither previous evaluation identified a single medication that satisfied all the content utility criteria [2, 4]. Thus, these categories an idealized framework for what should be included in CMI to inform safe and effective medication use. The 11 content utility criteria from this framework were used to assess the information in Danish CMI.

Min.medicin.dk provides a standardized format for its CMI. The landing page includes the name of the medication in large font as well as a brief sentence below to describe the medications purpose and why it works (e.g., “Avamys is a remedy for hayfever. Corticosteroid”). The conditions a medication is used to treat and the dosage forms (e.g., nasal spray, ointment, intravenous, inhaler, tablet) are also listed and are hyperlinked to descriptions of the conditions. Generic names can be searched, but only brand name medications are shown for CMI. Every medication has the same series of

standard collapsible content categories as well as some additional categories only if relevant to the medication (e.g., "Traffic: Caution is advised when operating machinery"). Standard categories (i.e., shown for every medication) from minmedicin.dk were compared with Monkman and Kushniruk's content utility Criteria [2, 4] to examine the topics the countries communicate in their CMI. Additionally, design differences between Danish and Canadian CMI were examined.

The authors attempted to use the same 10 medications from a previous study [4]. However, Zatidor, Loprox, Parnate were not listed on the min.medicin.dk, so they were substituted with other medications of the same route to maintain two medications per route (i.e., nasal sprays, inhalers, eye drops, creams, and tablets). Additionally, an injected medication, was added to this investigation. Thus, this study examined CMI from min.medicin.dk for 11 medications (i.e., Avamys, Nasonex, Onbrez, Asmanex, Acular, Sandoz-Timolol, Betnovate, Aldara, Doxycycline, Sibelium, and Xomolix).

2. Results

2.1. Content Utility

Seven of the 11 content utility [2, 4] criteria were satisfied by the standard categories of the Danish CMI examined (see Table 1). Of the shared categories (i.e., those in both Danish and Canadian CMI), Adverse Effects, Contraindications, and Directions demonstrated that despite addressing similar topics, content was communicated to consumers differently and these differences will be discussed in more detail.

Table 1. Similarities Between Monkman and Kushniruk's [2, 4] Content Utility Criteria and the Standard min.medicin.dk Content Categories

Content Utility Criteria	Min.medicin.dk Standard Content Categories
Contraindications Who should not use the medication	**Do Not Use** Who should not use the medication **Pregnancy** If a medication is suitable for use during pregnancy **Breast Feeding** If a medication is suitable for use while breastfeeding
Adverse Effects Possible side effects and what to do about side effects	**Adverse Effects** Possible side effects and how frequently they occur organized in tabular format. Other, more rare, side effects are listed. A hyperlink offers additional general information on side effects and how to respond if they occur.
Drug Interactions Medications that may be problematic to use in conjunction	**Taking Other Medications** Medications that may be problematic to use in conjunction
Precautions Precautions that need to be taken while using the medication	**Special Warnings** People who should use the medication with caution, symptoms that warrant immediate attention from a healthcare provider, or general warnings.
Directions Specific directions about how to take the medication	**Instructions** (if applicable) Slide show or video of how to administer the medication
Benefits The benefits of taking the medication **General information** (e.g., description of medication)	**Application** What the medication is used to treat and any requirements necessary for it to be effective.

Differences were observed between how Canadian and Danish CMI communicated adverse effects. In a previous study of CMI from three different Canadian pharmacies, side effects were classified as possible, serious, and rare but serious depending on the pharmacy source [2]. However, the CMI in Monkman and Kushniruk's previous investigations [2, 4] merely listed the potential side effects but no indication of the probability one would experience a side effect if taking the medication was conveyed. In contrast, the Danish CMI reported side effects in more detail and in a tabular format. All the possible side effects in the Danish CMI were qualified in terms of frequency using words (e.g., very common, general, uncommon, rare) with corresponding proportions (e.g., no more than 1 out of 100 people).

How contraindications were categorized varied between Canadian and Danish CMI. Specifically, Denmark used Pregnancy and Breastfeeding as independent categories in their CMI and identified whether it was safe to use the medication under these circumstances. In contrast, Canadian CMI describes whether a medication may be used under supervision (i.e., a precaution) or not (i.e., a contraindication) while a woman is pregnant or breastfeeding. Despite being comparable to contraindications in Table 1, pregnancy and/or breastfeeding may be discussed as precautions or may not be mentioned at all in Canadian CMI if there is no cause for concern.

The four content utility categories not present in Danish CMI were Missed Dose, Allergic Reaction, Overdose, and Storage. Despite these shortcomings, Danish CMI contained nine additional standard content categories (see Table 2). However, not all Canadian CMI previously studied satisfied these criteria either [2, 4]. Further, despite not explicitly mentioning Allergic Reactions, the active ingredients and the excipients were listed in Danish CMI and could be used to detect potential allergens.

Table 2. Additional Standard Content Categories from minmedicin.dk Not Included in Monkman and Kushniruk's [2, 4] Content Utility Criteria

Additional Min.medicin.dk Standard Content Categories
Active Substances The ingredients that make the medication effective.
Dosage Common doses for different groups (e.g., adults and children, male or female) as applicable, notes for use (e.g., shake the container before using, use consistently for full effect)
Blood Donor If donating blood should be avoided while taking this medication
Effect How the medication works in the body
Pharmaceutical Forms The different formulations of the medication available
Excipients Inactive substances that serve as the medium
Company The pharmaceutical manufacturer
Packages, Prices, Subsidies, and Extradition If the medication is subsidized by the healthcare system, if a prescription is necessary to receive it, the dosage forms and strengths, packages available, and respective price for the different producers of the drug.
Image Identification Photographs of the medication

Generally, Danish CMI provided more detailed information, some of which may be important for safe and effective medication use. For example, knowing what the medication looks like might be important, especially for people who get multiple drugs or those who have their daily mediations combined into blister packs. Other topics may

be for people who want a deeper understanding of the medication such as how the medication works in the body. Some information suited other purposes such as whether you could give blood while taking this medication. However, some of the topics not important for medication safety but more for general information (e.g., packaging, company, cost). Consumers may find cost information very valuable.

2.2. Design

Canadian CMI is provided solely in text, whereas Danish CMI made use of multimedia to support the information. For example, pictures of the medication were used in the Image Identification category. Slide shows were also used to demonstrate the steps or procedure of how to apply both nasal sprays and eye drops in the Danish CMI. Moreover, videos showed how inhalers should be used. There are inherent limitations to Canadian CMI, as it is primarily printed on paper. Only one of the pharmacies in the authors' previous work on Canadian CMI was offered online [2]. In contrast to paper, min.medicin.dk provides the user with an overview of the information contained on the page without being overwhelming and may facilitate finding specific information. Specifically, the content categories were collapsed on min.medicin.dk landing pages allowing the different information topics to be visible simultaneously. Thus, rather than a dense wall of text, users were only shown headings with ample negative space. This format should expedite information seeking behavior and allow users to find answers to their questions more quickly than having to parse all the text available on a medication. Monkman and Kushniruk [2] reported that despite the one Canadian CMI examined online being the most comprehensive (and lengthy), it was unfortunately designed as a single long page without collapsible categories and therefore failing to facilitate information seeking.

3. Discussion

As previously noted, the method of providing consumers with CMI between countries is different and appeared to have implications on both the content and design. With respect to content, despite providing mostly similar information, how the information was categorized was slightly different for some topics between the two countries. Generally, the Danish CMI contained more topics, but some had limited relevancy to the safe and effective use of medications.

Many of the design differences between Danish and Canadian CMI may result from the different dispensing methods (i.e., hardcopy vs. digital). Danish CMI often complemented text with multimedia where possible (e.g., pictures of the medication, videos of how to use the medication), whereas Canadian CMI is strictly limited to text. Further, Monkman and Kushniruk [4] described the missed opportunity of Canadian CMI in avoiding describing the procedural steps of using inhalers and instead referred consumers to the paper package inserts. In contrast, Danish CMI not only collocates instructions, but it also uses videos to demonstrate the steps, which may be clearer and potentially more memorable than text.

Another advantage to min.medicin.dk is that, to some extent, Danes are provided with a "single source of truth" with respect to medication information. Although, there may be some discrepancy between types of medication information (e.g., CMI vs. paper package inserts) in Denmark, it is not likely to be as variable as in Canada. The

CMI Canadians receive is dependent on the pharmacy used to fill a prescription [1]. Therefore, Canadians are getting more, less, or simply different information depending on the pharmacy they use to fill their prescriptions.

Providing eHealth solutions (e.g., online CMI) may unintentionally exacerbate the digital divide or difference between People Like Us (PLUs) and the Disadvantages, Disconnected, and Disengaged (DDDs), whereas paper CMI is equally accessible by everyone [6]. That is, Danish CMI is only available online and therefore users a) must seek it out and b) navigate min.medicin.dk to find information. However, the user controls the amount of visible information on min.medicin.dk through expandable categories. Users are significantly faster, more accurate, remember better, and prefer websites that have concise content that is easy to scan [7]. Danish CMI also complements text with images, video, and narration which may support understanding. In contrast, Canadians are provided paper copies of CMI with every new prescription and might be more inclined to read it than if they had to seek it out. No navigation is required with printed CMI. However, in this format all information must be displayed simultaneously, which has the potential to overwhelm users. Unfortunately, the only example of Canadian online CMI studied from our previous work failed to capitalize on the digital medium (i.e., it was simply a long page of text) [2] and was likely more difficult to use, read, and understand as a result. Both methods of delivery have their respective advantages and disadvantages. However, the design of Danish CMI appeared to be superior on many levels. A limitation of this study is that the actual written content could (e.g., number of words, readability score) could not be evaluated. Further research is required to determine which delivery method is more accessible and understandable from a user's perspective in terms of delivery, content, and design.

This study identified some similarities and differences between how Canadians and Danes are informed about medications. International comparisons may prove useful in leveraging the advantages of different approaches to designing and dispensing CMI to improve future CMI. However, further research is required to determine what content, design, and methods of delivery are most beneficial supporting safe and effective medication use. The first author is working towards this goal by examining Canadian consumers' opinions, preferences, and memorability of CMI. Additionally, how and when consumers seek out CMI as well as how these resources are used and understood in naturalistic settings also warrants investigation.

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